Name: ____________________________

EOC FSA

Practice Test

Geometry

No Calculator Portion

Compiled by the Broward County Public Schools
Office of Instruction and Intervention
Mathematics, Science, & Gifted Department

Geometry EOC FSA Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Geometry EOC FSA Mathematics Reference Sheet

Formulas

$$\sin A° = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos A° = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan A° = \frac{\text{opposite}}{\text{adjacent}}$$

$$V = Bh$$

$$V = \frac{1}{3}Bh$$

$$V = \frac{4}{3}\pi r^3$$

$y = mx + b$, where m = slope and b = y-intercept

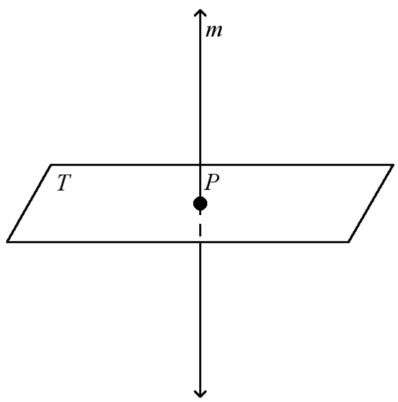
$y - y_1 = m(x - x_1)$, where m = slope and (x_1, y_1) is a point on the line

Name: ______________________ Class: _________________ Date: _________ ID: A

Geometry EOC FSA Practice Test (Non-Calculator Portion)

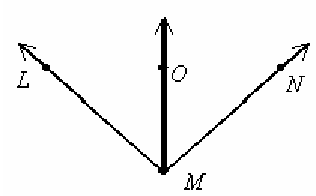
____ **1** Identify the statement as true or false and justify your answer.

If m is perpendicular to plane T through point P, there is not another line perpendicular to plane T through point P.



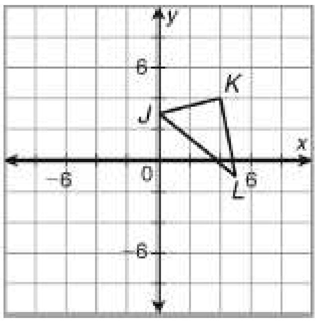
A. True; If a line is perpendicular to a plane, any line perpendicular to that line at the point of intersection of the line and the plane is contained by the plane.
B. True; Given a point on a plane, there is one and only one line perpendicular to the plane through that point.
C. False; Given a point on a plane, there is one and only one line perpendicular to the plane through that point.
D. False; If a line is perpendicular to a plane, any line perpendicular to that line at the point of intersection of the line and the plane is contained by the plane.

____ **2** In the figure (not drawn to scale), $\overrightarrow{MO}$ bisects $\angle LMN$, $m\angle LMO = (13x - 31)°$, and $m\angle NMO = (x + 53)°$. Solve for x and find $m\angle LMN$.



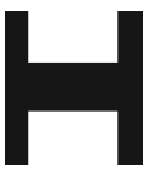
A. 2, 38° B. 2, 7° C. 7, 207° D. 7, 120°

____ **3** $\triangle JKL$ is rotated 90° about the origin and then translated using $(x,y) \rightarrow (x-8, x+5)$. What are the coordinates of the final image of point L under this composition of transformations?



A. $(-7,10)$
B. $(-7,0)$
C. $(-9,10)$
D. $(-9,0)$

____ **4** Which are the angle of rotation and the order of rotational symmetry for the figure?



A. 90°; 2
B. 180°; 2
C. 90°; 4
D. 180°; 4

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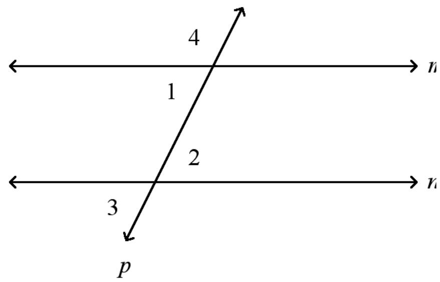
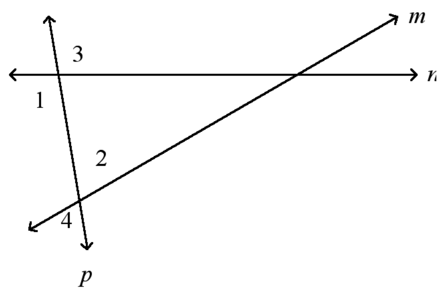
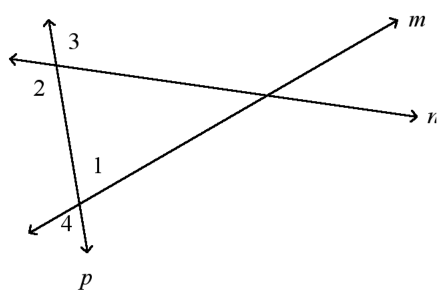
____ **5** Draw two lines and a transversal such that ∠1 and ∠2 are alternate interior angles, ∠2 and ∠3 are corresponding angles, and ∠3 and ∠4 are alternate exterior angles. What type of angle pair is ∠1 and ∠4?

A.


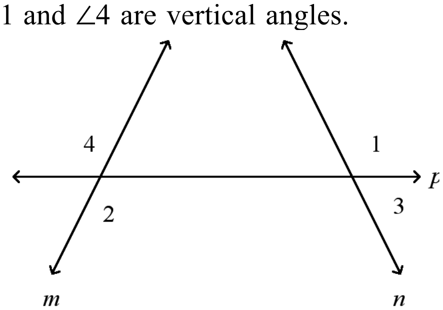
∠1 and ∠4 are supplementary angles.

B.


∠1 and ∠4 are corresponding angles.

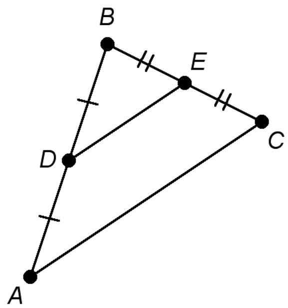
C.


∠1 and ∠4 are vertical angles.

D.


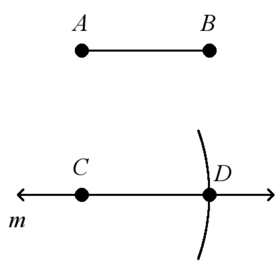
∠1 and ∠4 are alternate exterior angles.

____ **6** You want to use a coordinate proof to prove that midsegment $\overline{DE}$ of $\triangle ABC$ is parallel to $\overline{AC}$ and half the length of $\overline{AC}$. Which is the best first step?



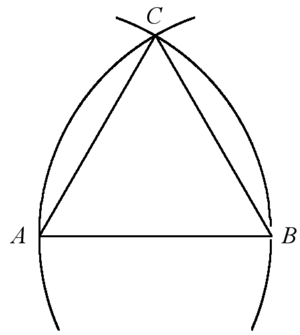
A. Place the triangle on a coordinate grid such that vertex A is at the origin, and $\overline{AC}$ lies on the x-axis.
B. Place the triangle on a coordinate grid such that $\overline{BC}$ lies on the x-axis and $\overline{AB}$ lies on the y-axis.
C. Place the triangle on a coordinate grid such that vertex B is at the origin.
D. Place the triangle on a coordinate grid such that vertex A is on the y-axis, and vertex C is on the x-axis.

____ **7** Which of the following best describes the construction?



A. $\overline{AB} \parallel \overline{CD}$
B. D is the midpoint of m.
C. $\overline{CD} \cong \overline{AB}$
D. C is the midpoint of m.

____ **8** **Given**: diagram showing the steps in the construction
Prove: m$\angle A$ = 60°



Complete the paragraph proof.

Proof:
The same compass setting was used to create $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$, so [1]. By the [2], ΔABC is equilateral. Since ΔABC is equilateral, it is also [3]. So $m\angle A + m\angle B + m\angle C = 180°$. Therefore, $m\angle A = 60°$.

A. [1] $\overline{AB} \cong \overline{BC} \cong \overline{CA}$
[2] definition of equilateral triangle
[3] equiangular

B. [1] $\overline{AB} \cong \overline{AB}$
[2] definition of equiangular triangle
[3] equiangular

C. [1] $\overline{AB} \cong \overline{BC} \cong \overline{CA}$
[2] definition of equilateral triangle
[3] isosceles

D. [1] $\overline{AB} \cong \overline{BC} \cong \overline{CA}$
[2] definition of angle bisector
[3] acute

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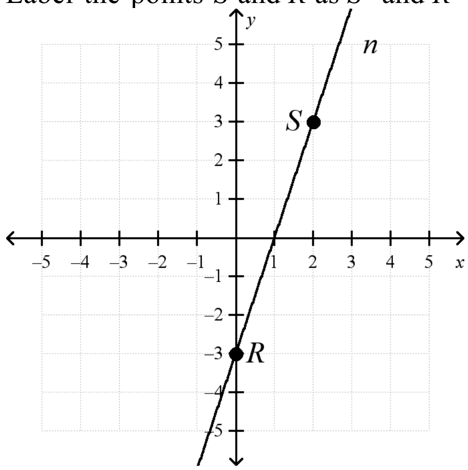
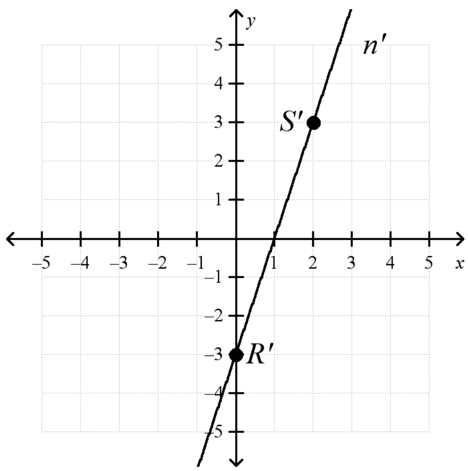
____ **9** Draw line n', the dilation of line n with the center of the dilation at the origin and a scale factor of $\frac{1}{2}$. Label the points S and R as S' and R' after dilation. What do you notice about lines n and n'?

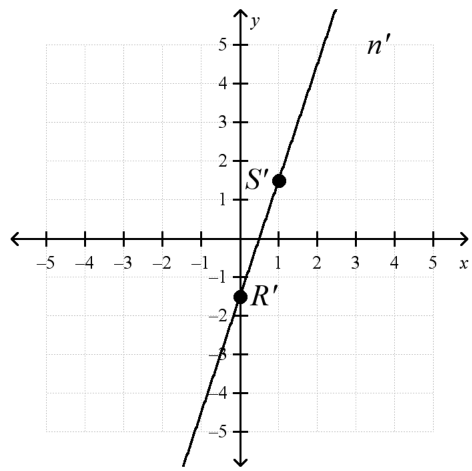


A.



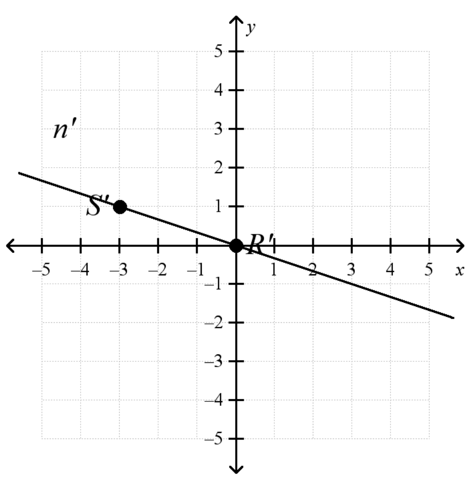
Lines n and n' are the same line.

C.



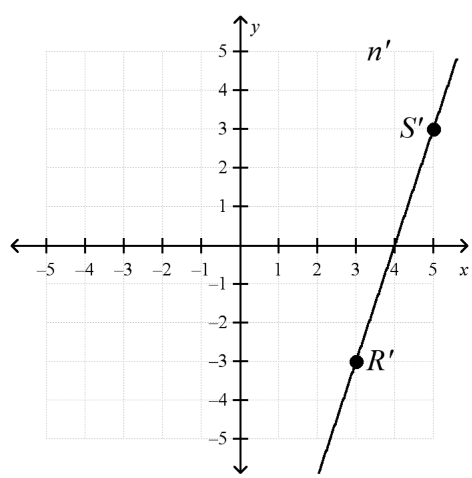
Lines n and n' are parallel..

B.



Lines n and n' are perpendicular.

D.

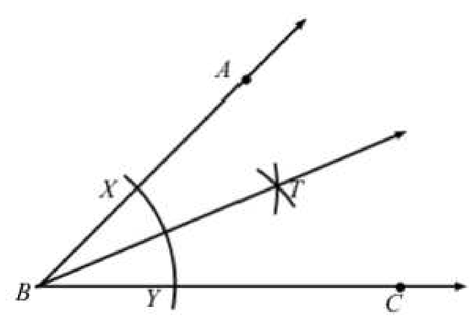


Lines n and n' are parallel.

____ **10** A student forms the conjecture, "A rhombus with a right angle is a square." Which answer choice correctly evaluates the student's conjecture?

A. The student's conjecture is incorrect. A rhombus has four congruent sides, so that satisfies one condition for being a square. But a square must have four right angles. The conjecture states that the rhombus has one right angle. Therefore it is not a square.
B. The student's conjecture is incorrect. You can prove that the rhombus is a rectangle but you cannot prove that it is a square. Specifically, since every rhombus is a parallelogram, its opposite angles must be congruent and its consecutive angles must be supplementary. If it has one right angle, then the angle opposite that angle must also be right. And the remaining two angles are consecutive with the right angle. So, they must also be right since they must be supplementary to the right angle. So, the rhombus has four right angles, making it a rectangle.
C. The student's conjecture is correct. A square is a parallelogram with four congruent sides and four congruent angles.You already have four congruent sides since the figure is a rhombus. You then need to prove that the rhombus has four right angles. Since every rhombus is a parallelogram, its opposite angles must be congruent and its consecutive angles must be supplementary. If it has one right angle, then the angle opposite that angle must also be right. And the remaining two angles are consecutive with the right angle. So, they must also be right since they must be supplementary to the right angle. So, the rhombus has four right angles. Together, four right angles and four congruent sides make the figure a square.
D. The student's conjecture is correct. Every rhombus is a parallelogram, and a parallelogram with one right angle must be a square. So, the rhombus is a square.

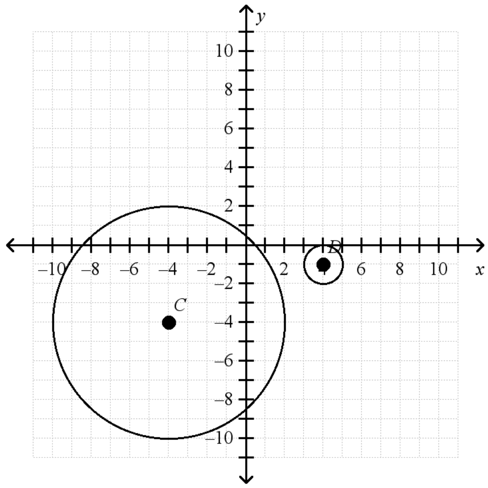
____ **11** The diagram shows $\angle ABC$ and the arcs that are swung to bisect it. After the compass identifies point T, you use a straightedge to draw $\overrightarrow{BT}$, the bisector of $\angle ABC$.



What theorems allow you to conclude that $\overrightarrow{BT}$ bisects $\angle ABC$?

A. $\triangle BAT \cong \triangle BCT$ by SAS and $\angle ABT \cong \angle CBT$ by CPCTC.
B. $\triangle BAT \cong \triangle BCT$ by SSS and $\angle ABT \cong \angle CBT$ by CPCTC.
C. $\triangle BXT \cong \triangle BYT$ by SAS and $\angle XBT \cong \angle YBT$ by CPCTC.
D. $\triangle BXT \cong \triangle BYT$ by SSS and $\angle XBT \cong \angle YBT$ by CPCTC.

____ **12** Which describes how Circle C can be transformed to show that Circle D is a similar figure?



A. translation of Circle C: $(x,y) \to (x+3, y+8)$; dilation of the image with center $(4, -1)$ and scale factor 6

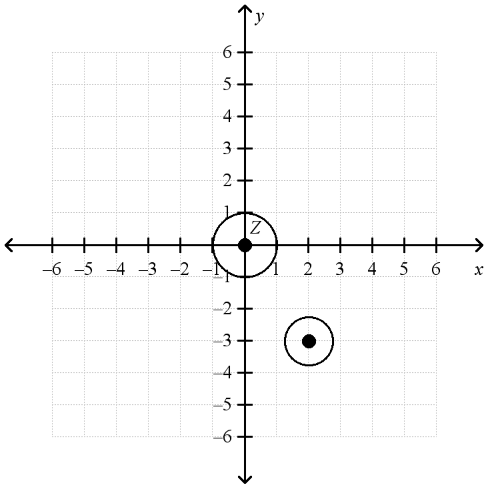
B. translation of Circle C: $(x,y) \to (x+8, y+3)$; dilation of the image with center $(4, -1)$ and scale factor $\frac{1}{6}$

C. translation of Circle C: $(x,y) \to (x+3, y+8)$; dilation of the image with center $(4, -1)$ and scale factor $\frac{1}{6}$

D. translation of Circle C: $(x, y) \to (x+8, y+3)$; dilation of the image with center $(4, -1)$ and scale factor 6

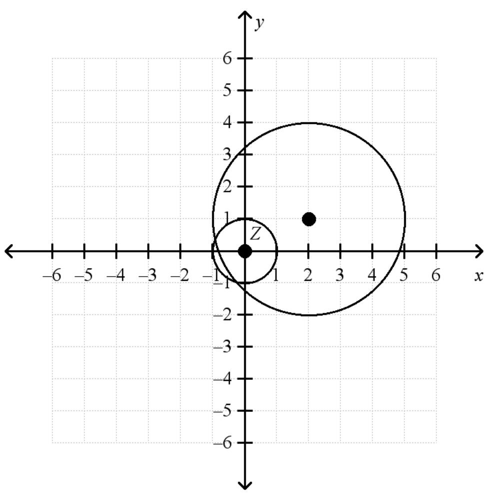
____ **13** Quentin wants to prove that all circles are similar, but not necessarily congruent. He draws Circle Z with center (0, 0) and radius 1. He then uses transformations to create other figures. Which drawing would *not* help Quentin prove that all circles are similar and why?

A.



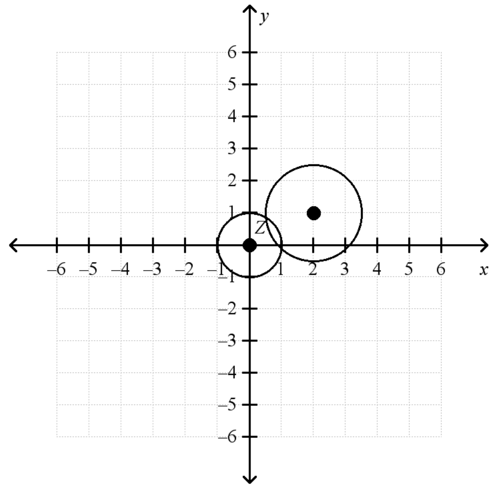
This would not help because the circles must have the same radius.

B.



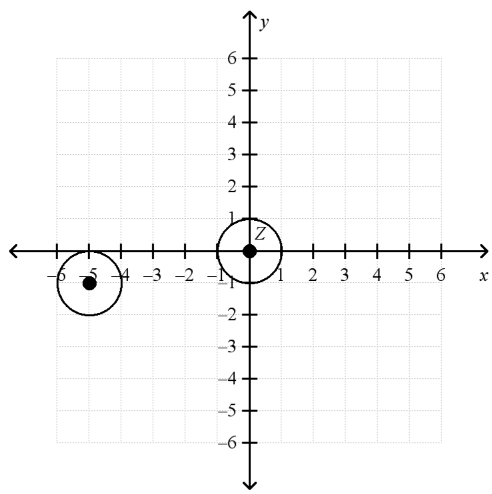
This would not help because the transformation should not include a translation.

C.



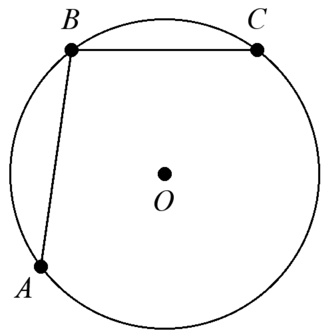
This would not help because the center of Circle Z should not be at the origin.

D.



This would not help because the circles are congruent.

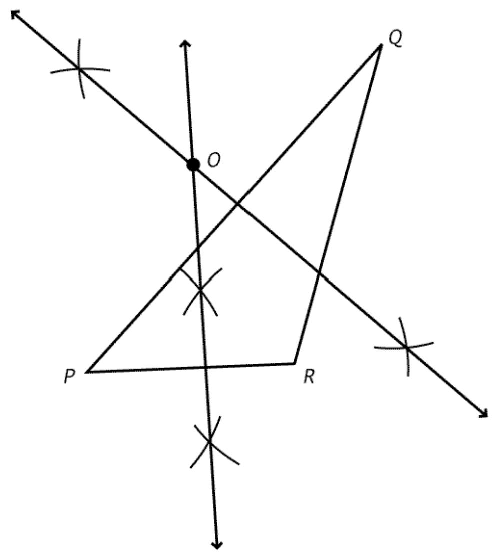
____ **14** A student tries to inscribe a parallelogram in a circle. The beginning of one of his tries is shown here.



After several tries, the student forms the conjecture, "It is impossible to inscribe a parallelogram in a circle." Which correctly evaluates the student's conjecture?

A. The student is correct. In the figure shown, the fourth vertex of the parallelogram would have to lie in the interior of Circle O. However, to be inscribed in a circle, the parallelogram's vertices must lie on the circle. Therefore, it is not possible to inscribe a parallelogram in a circle.
B. The student is incorrect. To find the fourth vertex, reflect point A across the vertical line passing through O, the center of the circle.
C. The student is incorrect. A parallelogram can be constructed by starting with consecutive right angles in the inscribed figure. Then, since opposite angles of an inscribed quadrilateral must be supplementary, all four angles will be right. So, the quadrilateral will be a rectangle, which is automatically a parallelogram.
D. The student is incorrect. Using the figure shown, an isosceles trapezoid can be constructed by drawing a line through A that is parallel to $\overline{BC}$. Label point D where that line intersects the circle. Then $ABCD$ is an isosceles trapezoid.

____ **15** Given $\triangle PQR$, Marissa constructed point O as shown.



Next Marissa will draw a circle with center O and radius $\overline{OQ}$. Which statement is true and why?

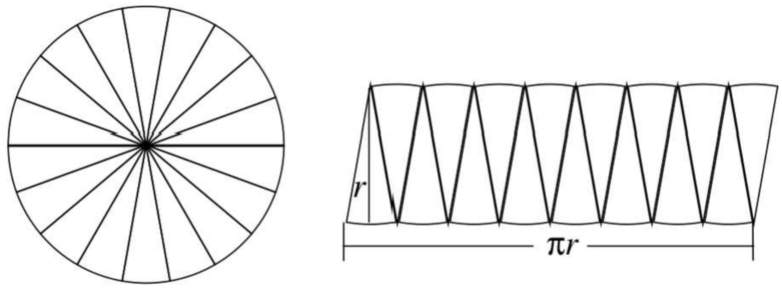
A. Circle O will be circumscribed about $\triangle PQR$ because point O is the intersection of two angle bisectors of angles of $\triangle PQR$.
B. Circle O will be inscribed in $\triangle PQR$ because point O is the intersection of two angle bisectors of angles of $\triangle PQR$.
C. Circle O will be circumscribed about $\triangle PQR$ because point O is the intersection of two perpendicular bisectors of sides of $\triangle PQR$.
D. Circle O will be inscribed in $\triangle PQR$ because point O is the intersection of two perpendicular bisectors of sides of $\triangle PQR$.

____ **16** XYZ is an acute triangle. Which are the correct steps to inscribe a circle in $\triangle XYZ$.

I. Construct a segment from point M perpendicular to one of the sides of $\triangle XYZ$.
II. Construct an angle bisector of $\angle X$.
III. With the point of the compass on point M, create the inscribed circle of $\triangle XYZ$.
IV. Label point M at the intersection of the angle bisectors.
V. Construct an angle bisector of $\angle Y$.
VI. Set the compass width equal to the length of the perpendicular segment.

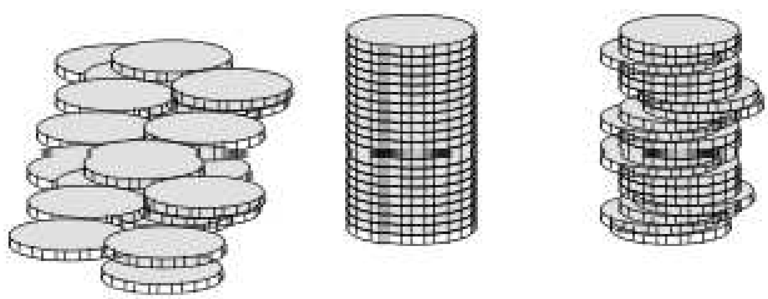
A. V, II, I, VI, IV, III
B. II, I, IV, V, IV, III
C. V, I, IV, II, IV, III
D. II, V, IV, I, IV, III

____ **17** A circle of radius r is broken into 16 equal sectors that are rearranged as the figure to the right of the circle, which has the same area as the circle. Where does the πr come from in the circle?



A. It represents the total area of eight of the 16 sectors of the circle.
B. It represents one-half of the total area of eight of the sectors of the circle.
C. It represents the sum of the arc lengths of the 16 sectors, or the circle's circumference.
D. It represents the sum of the arc lengths of eight sectors, or half of the circle's circumference.

____ **18** Three children are each given 20 quarters. The drawing shows how each of the children places their quarters on a table.



How is Cavalieri's Principle illustrated in the drawing?

A. Since each of the children has 20 quarters, the total volume of their quarters is the same. So, the three groups of quarters have the same volume by Cavalieri's Principle.
B. The first and second students' quarters illustrate Cavalieri's Principle. Even though the first student scattered the quarters, you know that the volume of those quarters must be the same as the volume of the second student's quarters since both groups contain 20 quarters.
C. The second and third students' quarters illustrate Cavalieri's Principle. Since the two stacks have the same height, they must have the same total volume since there are 20 quarters in each.
D. The second and third students' quarters illustrate Cavalieri's Principle. The two stacks have the same height since there are 20 quarters in each. And every cross-section that is parallel to the tabletop will be the same for each stack. So, the total volume is the same for the two stacks.

____ **19** A student wants to use a coordinate proof to show that the circumcenter of a right triangle is the midpoint of its hypotenuse. Let XYZ be a right triangle with right angle at X. Which provides the **best** strategy for her to use in her proof?

A. Position the vertices at $X(0,0)$, $Y(0,2a)$, and $Z(2b,0)$. Use the Midpoint Formula to find $M(b,a)$, the midpoint of $\overline{YZ}$. Then use the Distance Formula to prove that M is equidistant from X, Y and Z.

B. Position the vertices at $X(0,0)$, $Y(0,a)$, and $Z(b,0)$. Use the Midpoint Formula to find $M\left(\frac{a}{2},\frac{b}{2}\right)$, the midpoint of $\overline{YZ}$. Then use the Distance Formula to prove that M is equidistant from $\overline{XY}$, $\overline{XZ}$, and $\overline{YZ}$.

C. Position the vertices at $X(0,0)$, $Y(0,8)$, and $Z(6,0)$. Use the Midpoint Formula to find $M(3,4)$, the midpoint of $\overline{YZ}$. Then use the Distance Formula to prove that M is equidistant from $\overline{XY}$, $\overline{XZ}$, and $\overline{YZ}$.

D. Position the vertices at $X(0,0)$, $Y(0,2a)$, and $Z(2a,0)$. Use the Midpoint Formula to find $M(a,a)$, the midpoint of $\overline{YZ}$. Then use the Distance Formula to prove that M is equidistant from X, Y and Z.

____ **20** A teacher asks his class to prove that $ABCD$, whose vertices are $A(6,6)$, $B(1,8)$, $C(-3,-2)$, and $D(2,-4)$, is a rectangle. Four students' methods are summarized below. Which method does NOT prove that $ABCD$ is a rectangle?

A. Use the Distance Formula to show that $\overline{AC}$ and $\overline{BD}$ have the same length. Then use the Midpoint Formula to show that $\overline{AC}$ and $\overline{BD}$ have the same midpoint.

B. Use the Distance Formula to show that $\overline{AB}$ and $\overline{CD}$ have the same length, $\overline{AD}$ and $\overline{BC}$ have the same length, and $\overline{AC}$ and $\overline{BD}$ have the same length.

C. Use the formula for slope to show that slope$\left(\overline{AB}\right)$ = slope$\left(\overline{CD}\right)$ and slope$\left(\overline{AD}\right)$ = slope$\left(\overline{BC}\right)$. Then use the Distance Formula to show that $\overline{AB}$ and $\overline{CD}$ have the same length, and $\overline{AD}$ and $\overline{BC}$ have the same length.

D. Use the formula for slope to show that slope$\left(\overline{AB}\right)$ = slope$\left(\overline{CD}\right)$ and slope$\left(\overline{AD}\right)$ = slope$\left(\overline{BC}\right)$. Then use the Distance Formula to show that $\overline{AC}$ and $\overline{BD}$ have the same length.

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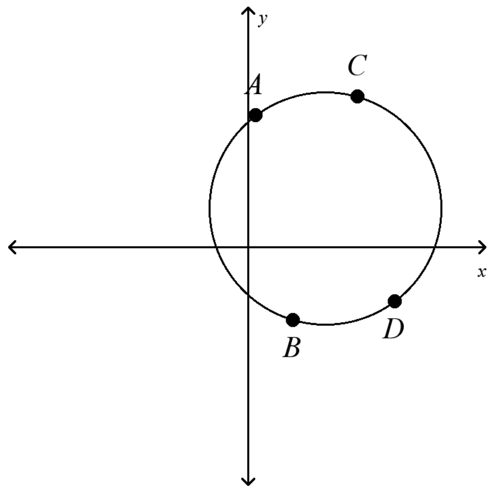
____ **21** Aiko was taught that you can find the center of a circle by drawing two chords on the circle and then constructing the perpendicular bisectors of each chord. The center then lies at the point where the perpendicular bisectors intersect. The circle shown here contains the points $A(2,28)$, $B(10,-16)$, $C(24,32)$ and $D(32,-12)$. When Aiko found the perpendicular bisectors of $\overline{AB}$ and $\overline{CD}$, his method for finding the center failed. Which explains correctly what went wrong and what Aiko can do to fix the problem?



A. $\overline{AB}$ and $\overline{CD}$ are parallel. So, the perpendicular bisectors of $\overline{AB}$ and $\overline{CD}$ are parallel lines and, therefore, do not intersect. To correct the problem, Aiko should find the intersection of the perpendicular bisectors of $\overline{AC}$ and $\overline{BD}$.

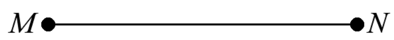
B. $\overline{AB}$ and $\overline{CD}$ are parallel. So, the perpendicular bisectors of $\overline{AB}$ and $\overline{CD}$ are the same line. The center of the circle lies on that line, but Aiko cannot tell where it is from his two constructions. To correct the problem, Aiko should find the intersection of the perpendicular bisectors of $\overline{AC}$ and $\overline{BD}$.

C. $\overline{AB}$ and $\overline{CD}$ are parallel. So, the perpendicular bisectors of $\overline{AB}$ and $\overline{CD}$ are parallel lines and, therefore, do not intersect. To correct the problem, Aiko should find the intersection of the perpendicular bisectors of $\overline{AB}$ and $\overline{AC}$.

D. $\overline{AB}$ and $\overline{CD}$ are parallel. So, the perpendicular bisectors of $\overline{AB}$ and $\overline{CD}$ are the same line. The center of the circle lies on that line, but Aiko cannot tell where it is from his two constructions. To correct the problem, Aiko should find the intersection of the perpendicular bisectors of $\overline{AB}$ and $\overline{AC}$.

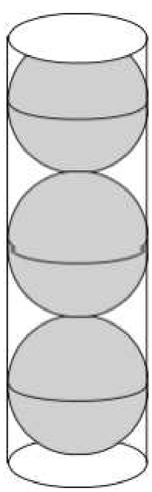
Name: ______________________ **ID: A**

____ **22** How can you partition the directed segment from M to N in the ratio 11:5 without constructing a parallel line?



A. Construct the midpoint of $\overline{MN}$. Label it A. Construct the midpoint of $\overline{AN}$. Label it B. Construct the midpoint of $\overline{AB}$. Label it C. Construct the midpoint of $\overline{CB}$. Label it D. D partitions the directed segment from M to N in the ratio 11:5.
B. Construct the midpoint of $\overline{MN}$. Label it A. Construct the midpoint of $\overline{MA}$. Label it B. Construct the midpoint of $\overline{BA}$. Label it C. Construct the midpoint of $\overline{BC}$. Label it D. D partitions the directed segment from M to N in the ratio 11:5.
C. Construct the midpoint of $\overline{MN}$. Label it A. Construct the midpoint of $\overline{AN}$. Label it B. Construct the midpoint of $\overline{AB}$. Label it C. Construct the midpoint of $\overline{CB}$. Label it D. Construct the midpoint of $\overline{CD}$. Label it E. E partitions the directed segment from M to N in the ratio 11:5.
D. Construct the midpoint of $\overline{MN}$. Label it A. Construct the midpoint of $\overline{AN}$. Label it B. Construct the midpoint of $\overline{AB}$. Label it C. Construct the midpoint of $\overline{CB}$. Label it D. Construct the midpoint of $\overline{DB}$. Label it E. E partitions the directed segment from M to N in the ratio 11:5.

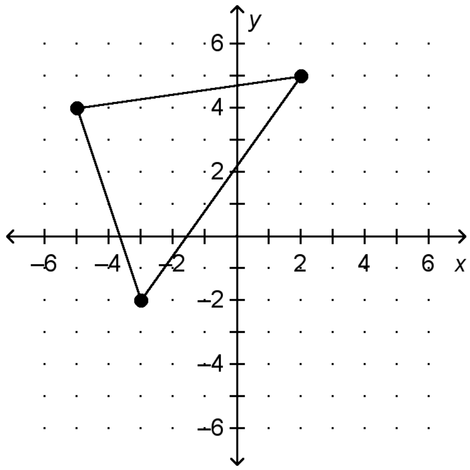
____ **23** Tennis balls are packed in cylindrical canisters, with three balls in each canister, as shown here.



Let C = the circumference of the can and let h = the height of the can. Assuming the balls fit snugly in the can, what can you conclude?

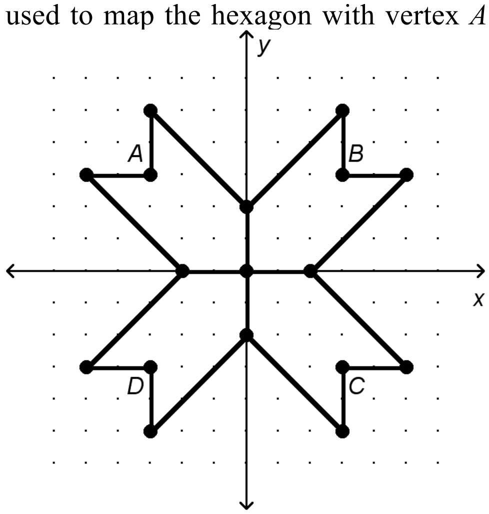
A. $C = h$ B. $C > h$ C. $C < h$ D. $C > 2h$

____ **24** Which of the following are the vertices of the image of the figure below under the translation $(x, y) \rightarrow (x+4, y-2)$?



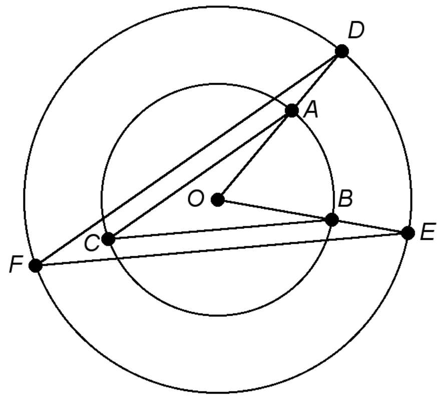
A. $(-1, 2)$
B. $(-9, 6)$
C. $(-2, 7)$
D. $(6, 3)$
E. $(1, -4)$
F. $(-7, 0)$

____ **25** A decorative design uses copies of an irregular hexagon. Which transformations of the design can be used to map the hexagon with vertex A to the hexagon with vertex C?



A. reflection across a line that contains A and C
B. reflection across a line that contains B and D
C. reflection across the x-axis followed by reflection across the y-axis
D. reflection across the y-axis followed by reflection across the x-axis
E. rotation $90°$ clockwise about vertex D
F. rotation $180°$ about the origin

____ **26** Choose the expressions below that are equivalent to $m\angle AOB$.



A. $\frac{1}{2}(m\angle ACB)$

B. $m\angle ACB$

C. $2(m\angle ACB)$

D. $m\overset{\frown}{AB}$

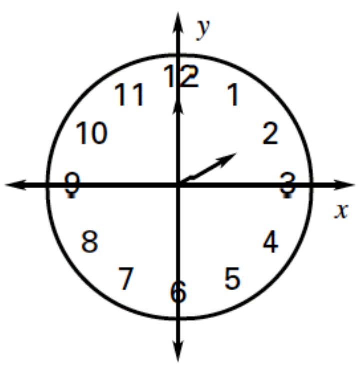
E. $m\angle DOE$

F. $m\angle DFE$

G. $2(m\angle DFE)$

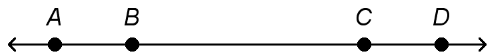
H. $m\overset{\frown}{DE}$

27 What number does the hour hand point to when it is transformed in the following way?



Rotated 120° counterclockwise

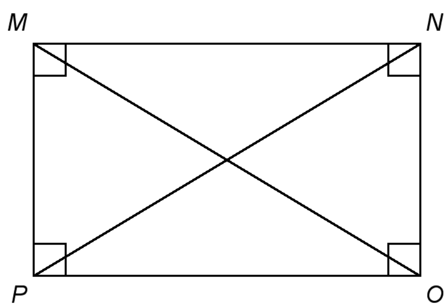
28 Complete the following proof.



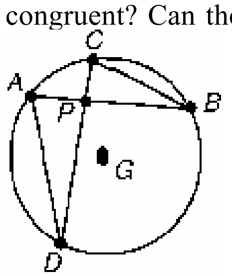
Given: $AB = CD$
Prove: $AC = BD$

Statements	**Reasons**
1. $AB = CD$	1. Given
2. $AB + BC = BC + CD$	2.
3. $AB + BC = AC$	3.
4.	4. Segment Addition Postulate
5. $AC = BD$	5.

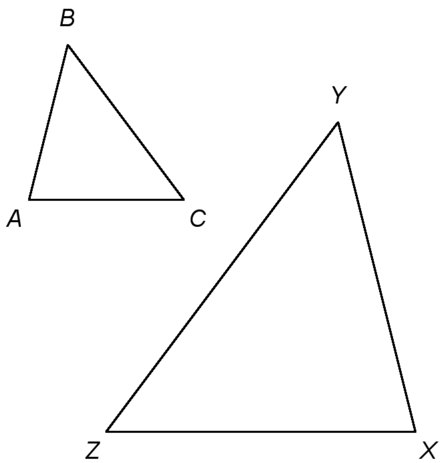
29 Jermaine wants to prove that the diagonals of rectangle $MNOP$ are congruent. He plans to use the SSS congruence criterion to conclude that $\triangle MOP \cong \triangle NPO$. Do you agree with his plan? Explain.



30 Given: $\odot G$ with intersecting chords $\overline{AB}$ and $\overline{CD}$ that meet at P. Can triangles ΔADP and ΔCBP be congruent? Can they be similar? Can they be neither congruent nor similar? Explain.

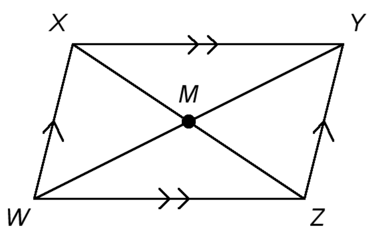


____ **31** Which of the following statements are true, given $\angle A \cong \angle X$ and $\angle C \cong \angle Z$?



A. $\angle B \cong \angle Y$
B. $\triangle ABC \sim \triangle XYZ$
C. $\triangle ABC \cong \triangle XYZ$
D. $\overline{AC} \cong \overline{XZ}$
E. There exists a sequence of dilations and rigid motions that maps $\triangle ABC$ onto $\triangle XYZ$.

32 To prove that the diagonals of a parallelogram bisect each other, Donna begins by stating that $\overline{XY} \cong \overline{WZ}$, since opposite sides of a parallelogram are congruent. Next, Donna determines that $\angle MXY \cong \angle MZW$ since they are alternate interior angles, and similarly, $\angle MYX \cong \angle MWZ$.



What can Donna conclude about $\triangle XYM$ and $\triangle ZWM$? Explain. Then use this information to finish the proof that the diagonals of a parallelogram bisect each other.